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L4: Entry 8 of 13

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TITLE: Method for estimating received power and a receiver

Brief Summary Text (3):

It is typical of a cellular radio environment that conditions for radio wave propagation change constantly. This is due to changes in the location of mobile stations with respect to the base station, as well as changes in the environment of mobile stations. In the connection between a mobile station and a base station, the attenuation to which radio waves are subjected on the radio path thus varies constantly. Consequently, especially the transmission power used by the mobile station must be monitored continuously, and adjusted at each moment of time. Generally, the aim is to minimize the transmission power used by the mobile station, so that both power consumption of the station and interference caused by the station to other connections will be minimal. Power adjustment is particularly critical in CDMA systems, in which the aim is that each base station receive the transmission of the mobile stations within its coverage area by using the same power level when possible.

Detailed Description Text (4):

in which y represents an observation vector, A is a matrix determining how an unobserved state vector x can be converted to an observation vector y , and v represents an observation noise vector. State transitions are denoted by the equation

Detailed Description Text (13):

The base station is capable of optimal adjustment of the transmission power of the mobile station by estimating measured values. The invention can be applied specifically in a CDMA cellular radio network, in which the base station must, in order to maximize the capacity of the cell, adjust the transmission power of mobile stations so that it receives all stations with the same signal strength. In this case, the accurate and rapid power adjustment enabled by the method of the invention is particularly advantageous.

Detailed Description Text (17):

In street corner situations, in which the signal propagation environment may change extremely rapidly, rapid power adjustment is necessary. In the method of the invention, the base station can adjust transmission power very rapidly on the basis of the measurement results. FIG. 3 illustrates a situation in which a mobile station which is communicating with a base station BTS1 comes to a street corner, and to the coverage area of a base station BTS2. Let us assume that the distance d_1 of the base station BTS1 from the street corner is longer than that d_2 of the base station BTS2. Let us further assume a system in which both base stations transmit by using the same frequency band, which is the case, e.g. in a cellular radio system applying the CDMA-multiple access method.

Detailed Description Text (22):

In accordance with a preferred embodiment of the invention, when the model describing dynamic behavior of the signal is formed, one or more interfering signals are also taken into account besides the actual signal. In such a case, it is possible to take possible correlations between signals into account. E.g. in

CDMA systems, spreading codes used for various connections are not fully independent, and thus correlation occurs between connections.